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(54) **EVAPORATED FUEL TREATMENT DEVICE FOR MOTORCYCLE**

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B62J 35/00	(2006.01)
B62J 37/00	(2006.01)
F02M 25/08	(2006.01)
F02M 35/16	(2006.01)

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(58) **Field of Classification Search**

CPC B62J 37/00; B62J 35/00; B62K 2202/00; B62K 15/01; B62K 15/03519

USPC 123/516; 137/585, 587, 588, 589, 590, 137/590.5, 591, 592, 593

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,656,460	A *	4/1972	Rogers	123/41.86
5,125,385	A *	6/1992	Frinzel	123/698
6,508,214	B1 *	1/2003	Uchida	123/65 PE
8,459,239	B2 *	6/2013	Yamagishi	123/519
8,870,226	B2 *	10/2014	Inaoka et al.	280/833

(Continued)

FOREIGN PATENT DOCUMENTS

CN	101844600	A	9/2010
JP	49-88172	U	7/1974

(Continued)

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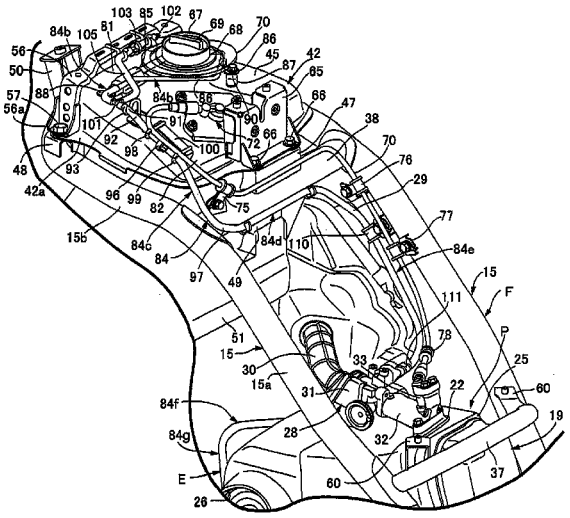
(57) **ABSTRACT**

A charge pipe passage includes: a first engine-side pipe passage part which extends vertically; a second engine-side pipe passage part which is connected to a lower end of the first engine-side pipe passage part on one side in the vehicle widthwise direction and extends from one side to the other side in the vehicle widthwise direction above the engine body; and a third engine-side pipe passage part which is communicably connected to the second engine-side pipe passage part on the other side in the vehicle widthwise direction and is connected to the engine body, and at least a part of the charge pipe passage between a frame-side support part and an engine-side support part is formed of an elastic tube.

8 Claims, 12 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

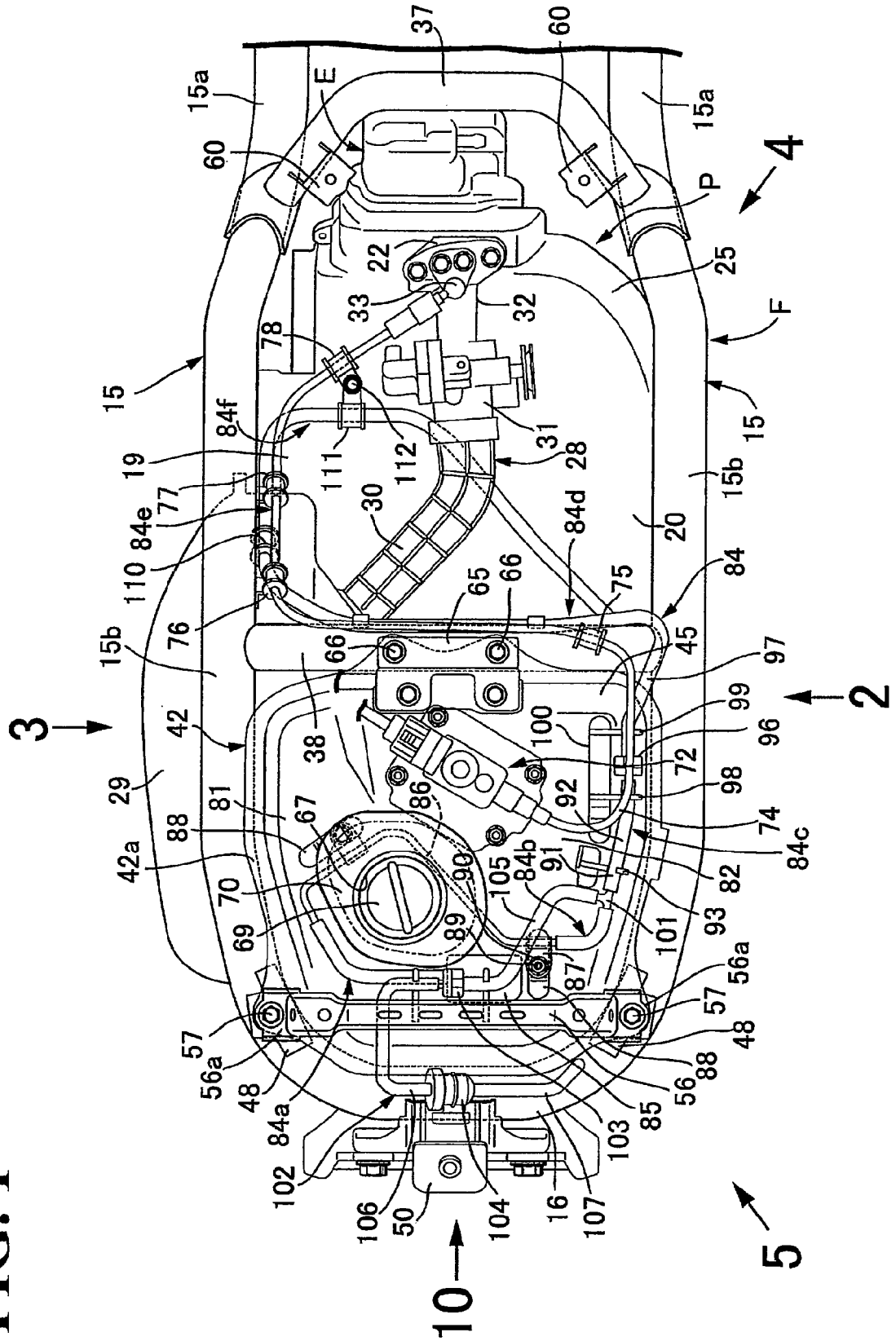
2003/0168028	A1	9/2003	Isoda et al.	
2005/0217947	A1*	10/2005	Honda et al.	188/1.11 W
2010/0051369	A1*	3/2010	Kuramochi et al.	180/69.4
2010/0243360	A1*	9/2010	Inaoka	180/225
2012/0193164	A1*	8/2012	Nagura et al.	180/291
2012/0240902	A1*	9/2012	Kondo et al.	123/518
2012/0240905	A1*	9/2012	Kondo et al.	123/519
2013/0192703	A1*	8/2013	Hochstein et al.	137/574
2013/0240281	A1*	9/2013	Inaoka et al.	180/219

FOREIGN PATENT DOCUMENTS

JP	61-11440	A	1/1986
JP	2009-203976	A	9/2009

* cited by examiner

FIG. 1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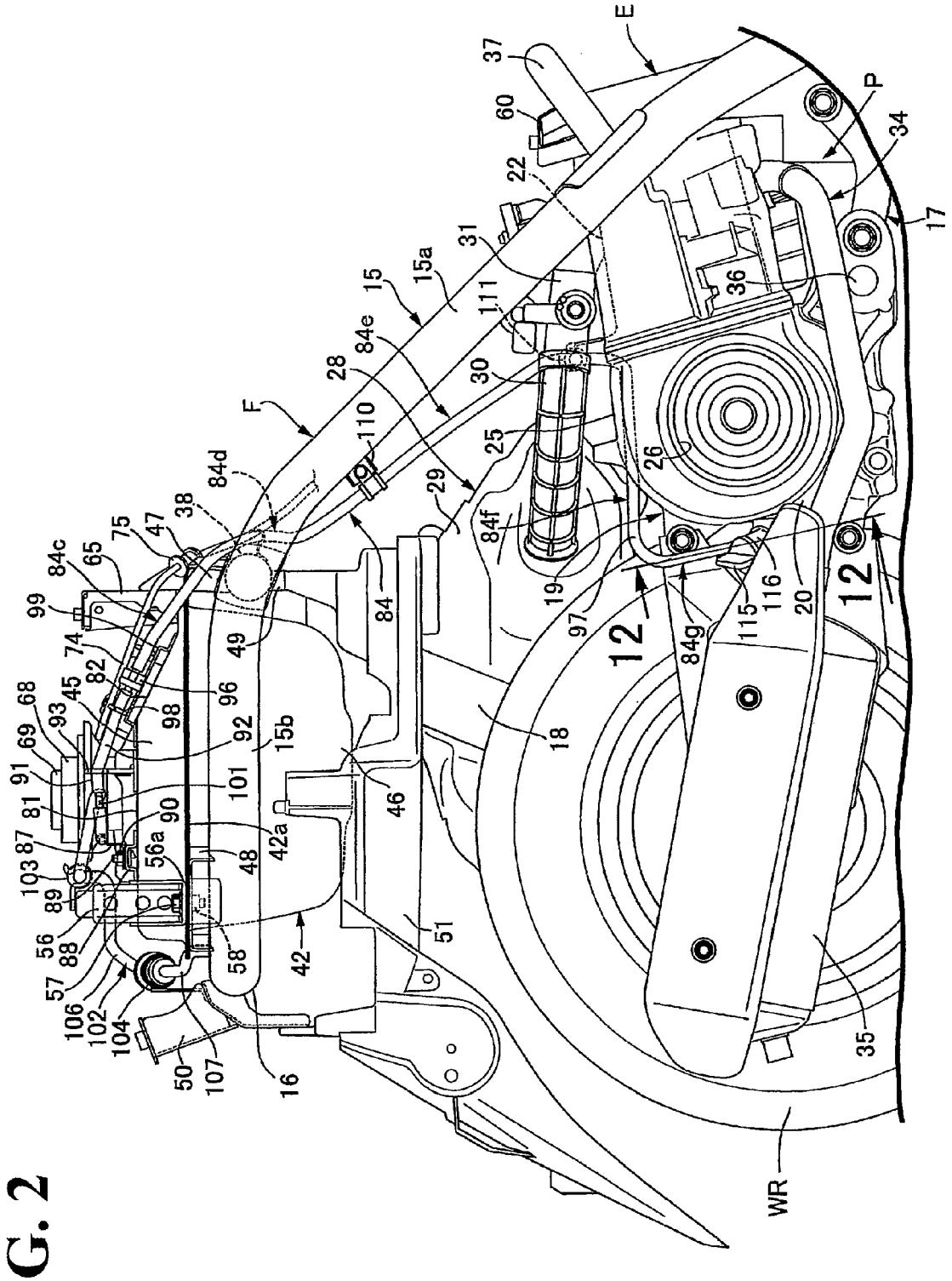
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15b
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WR

FIG. 2

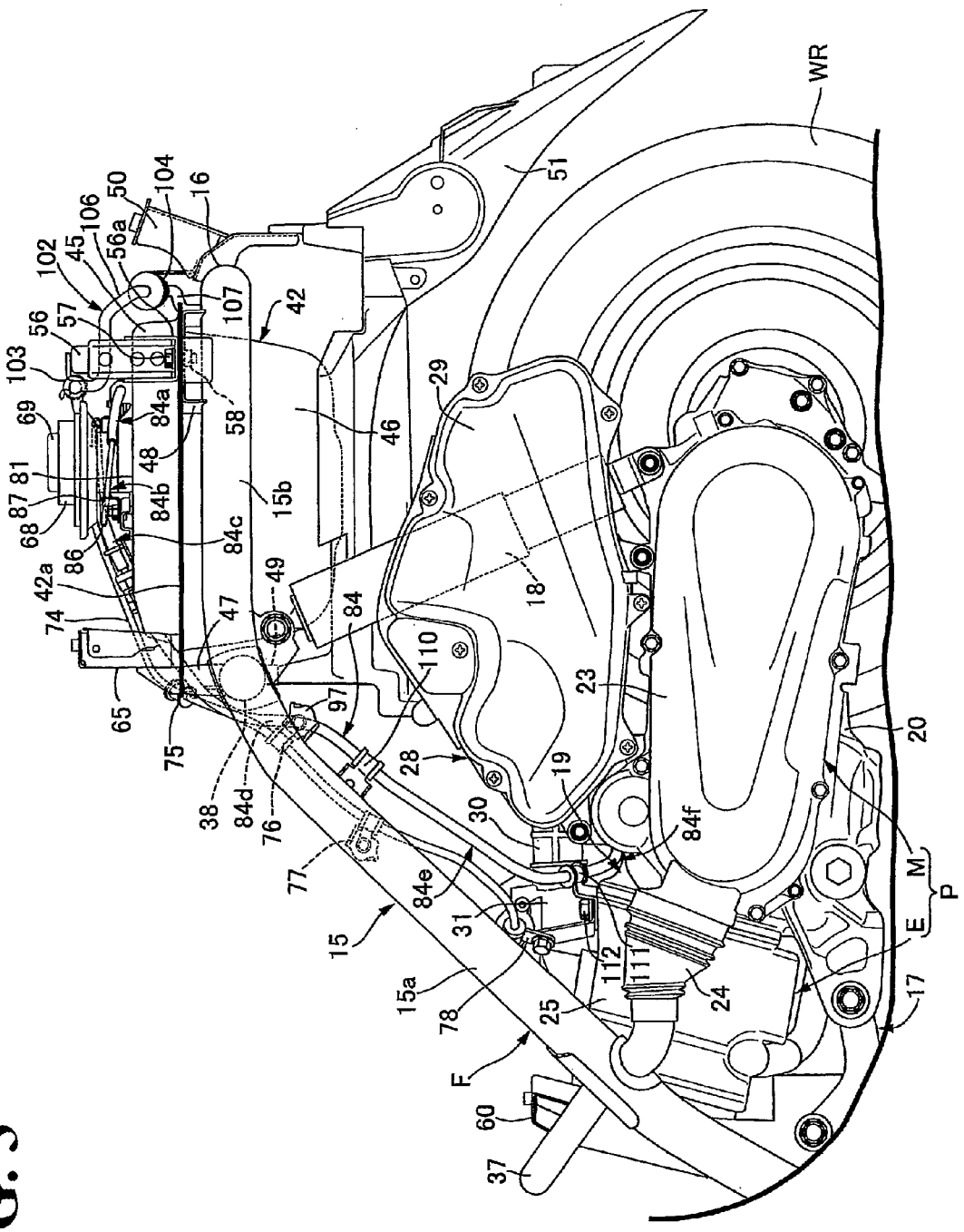
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FIG. 3

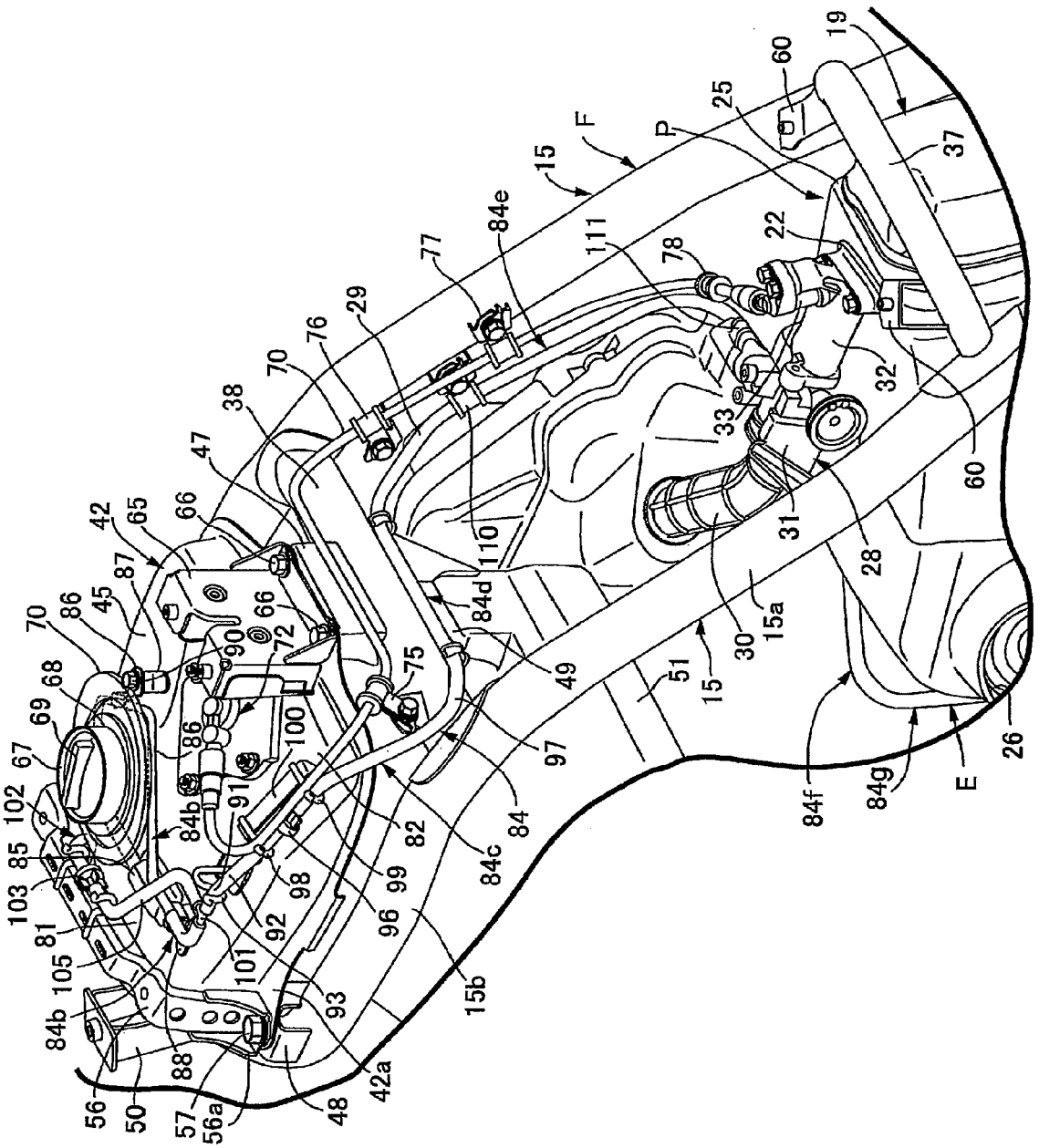
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FIG. 4

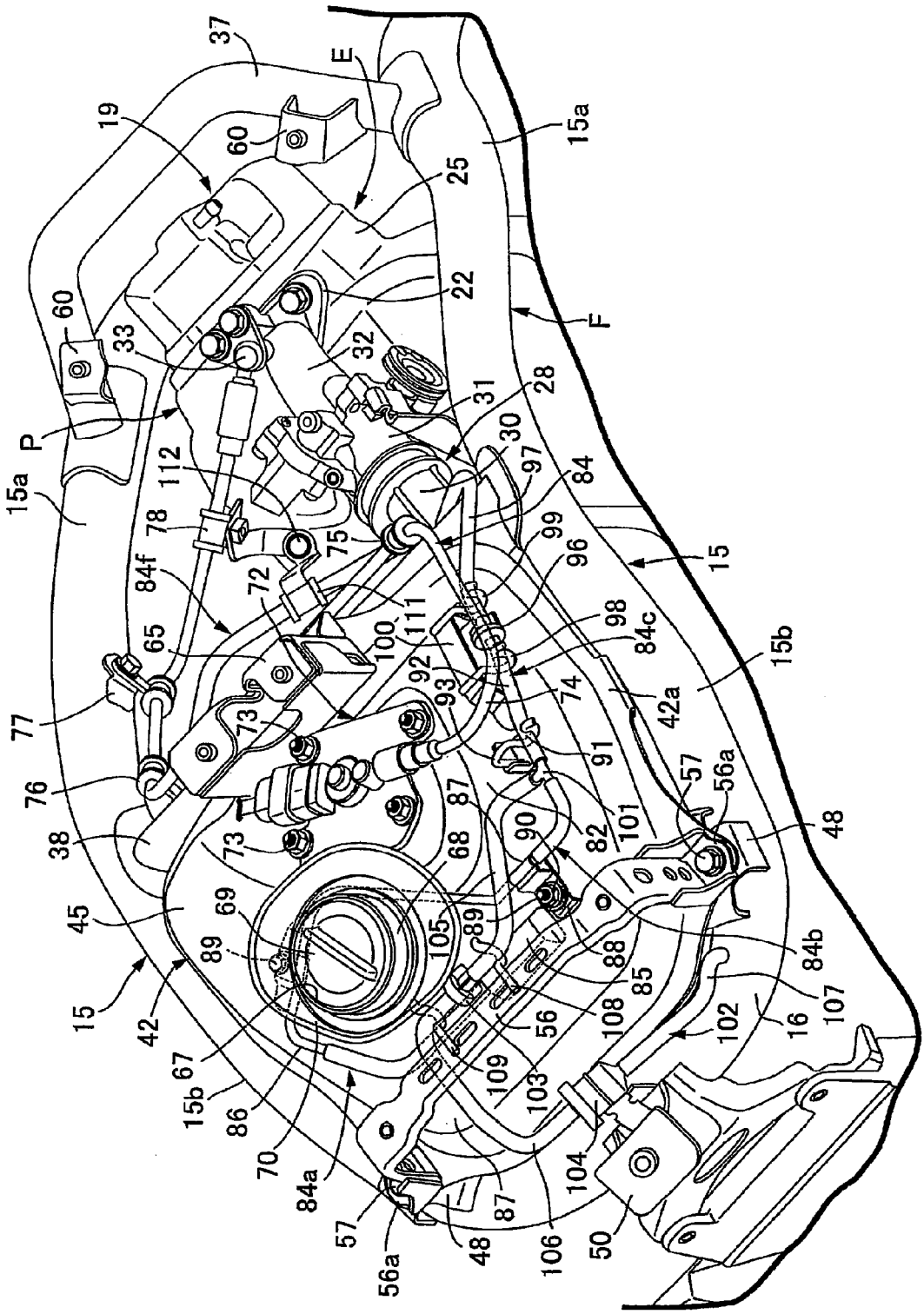
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FIG. 5

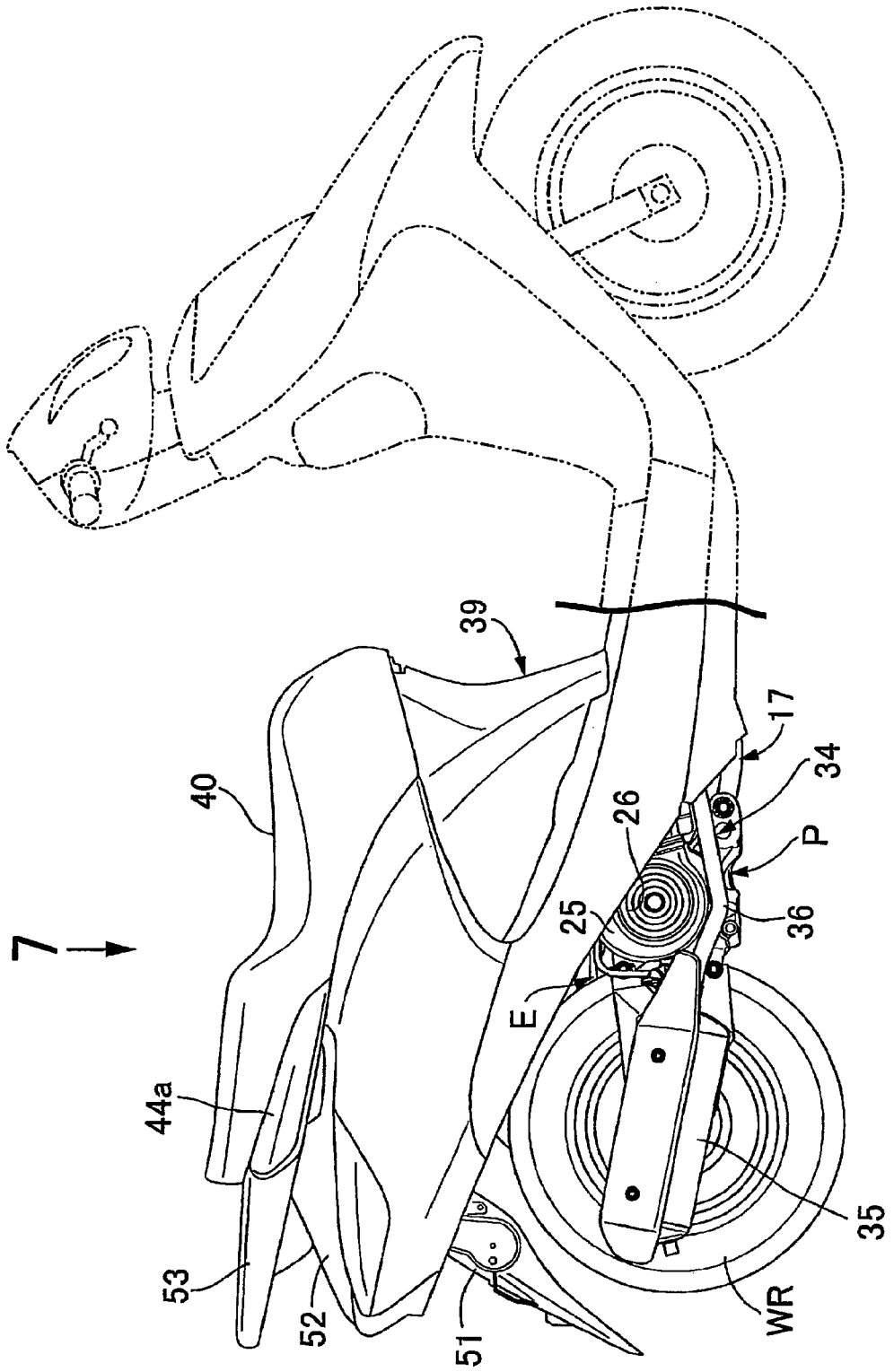

FIG. 6

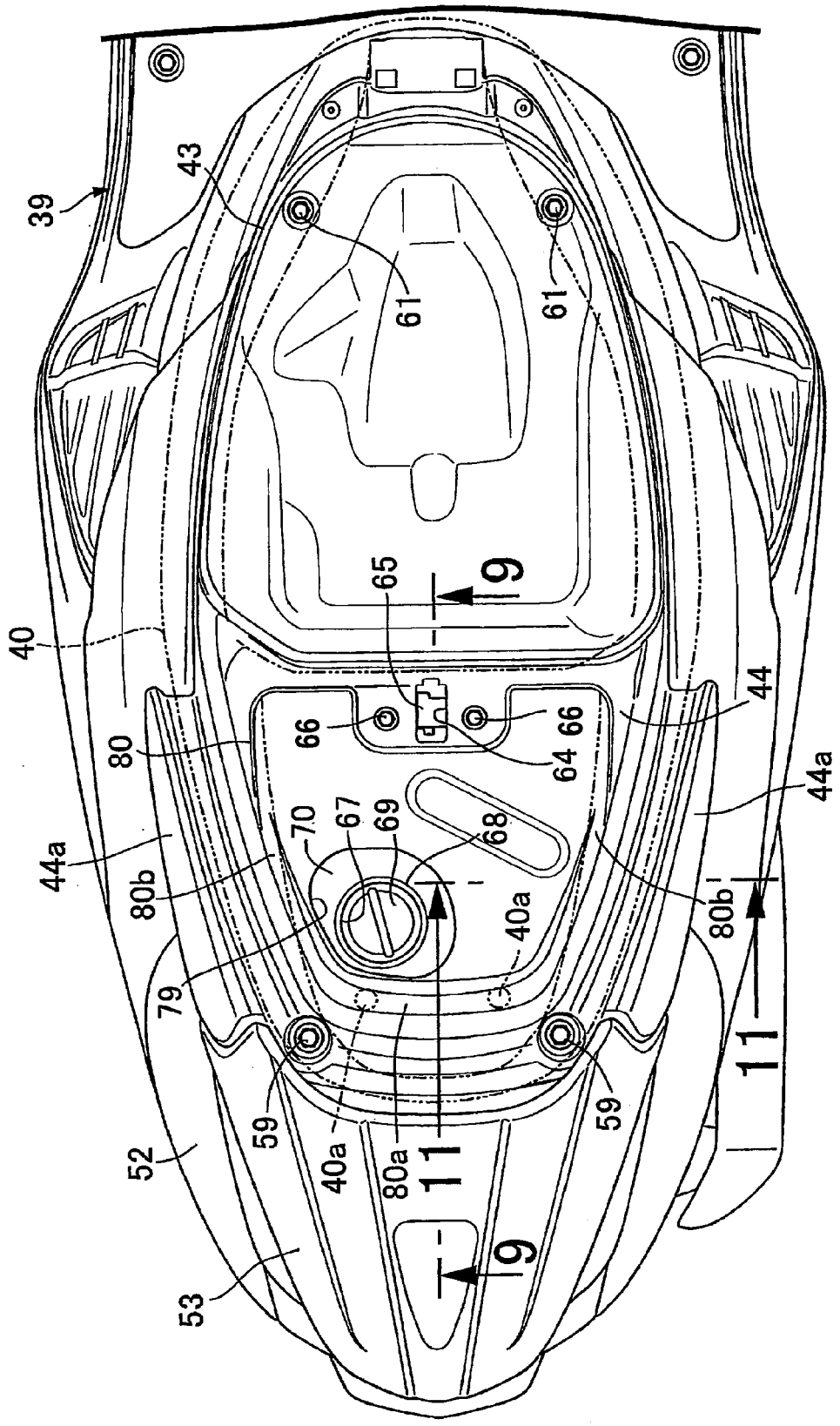
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FIG. 7

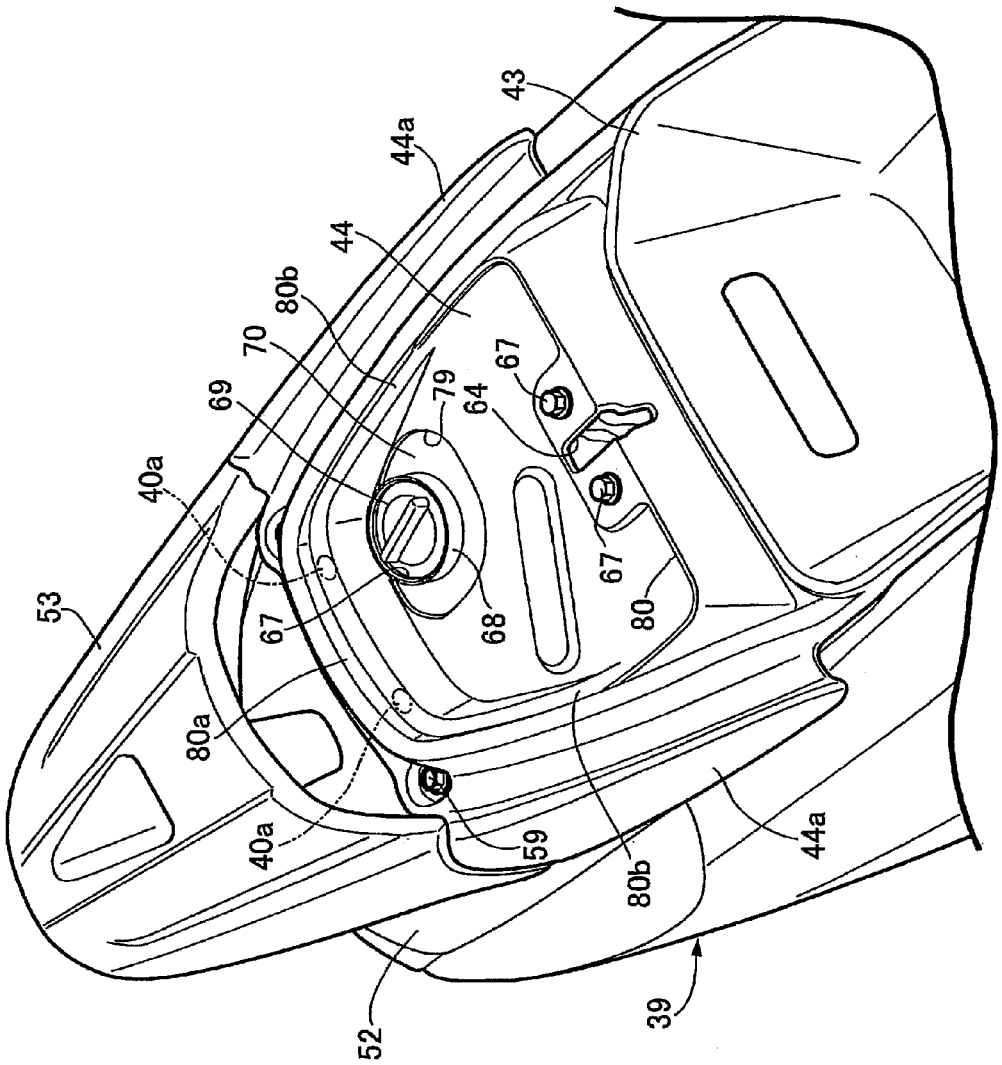
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FIG. 8

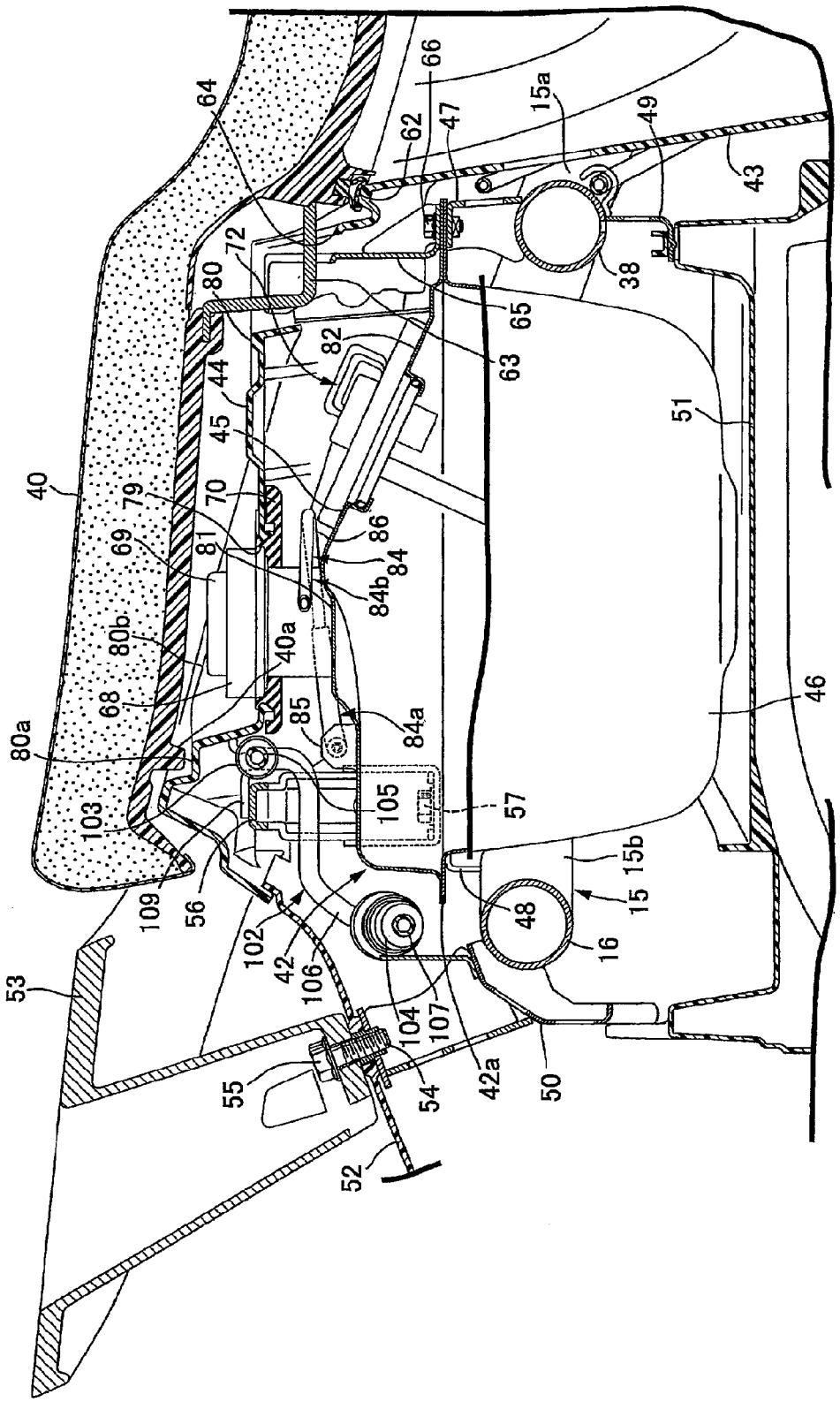
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FIG. 9

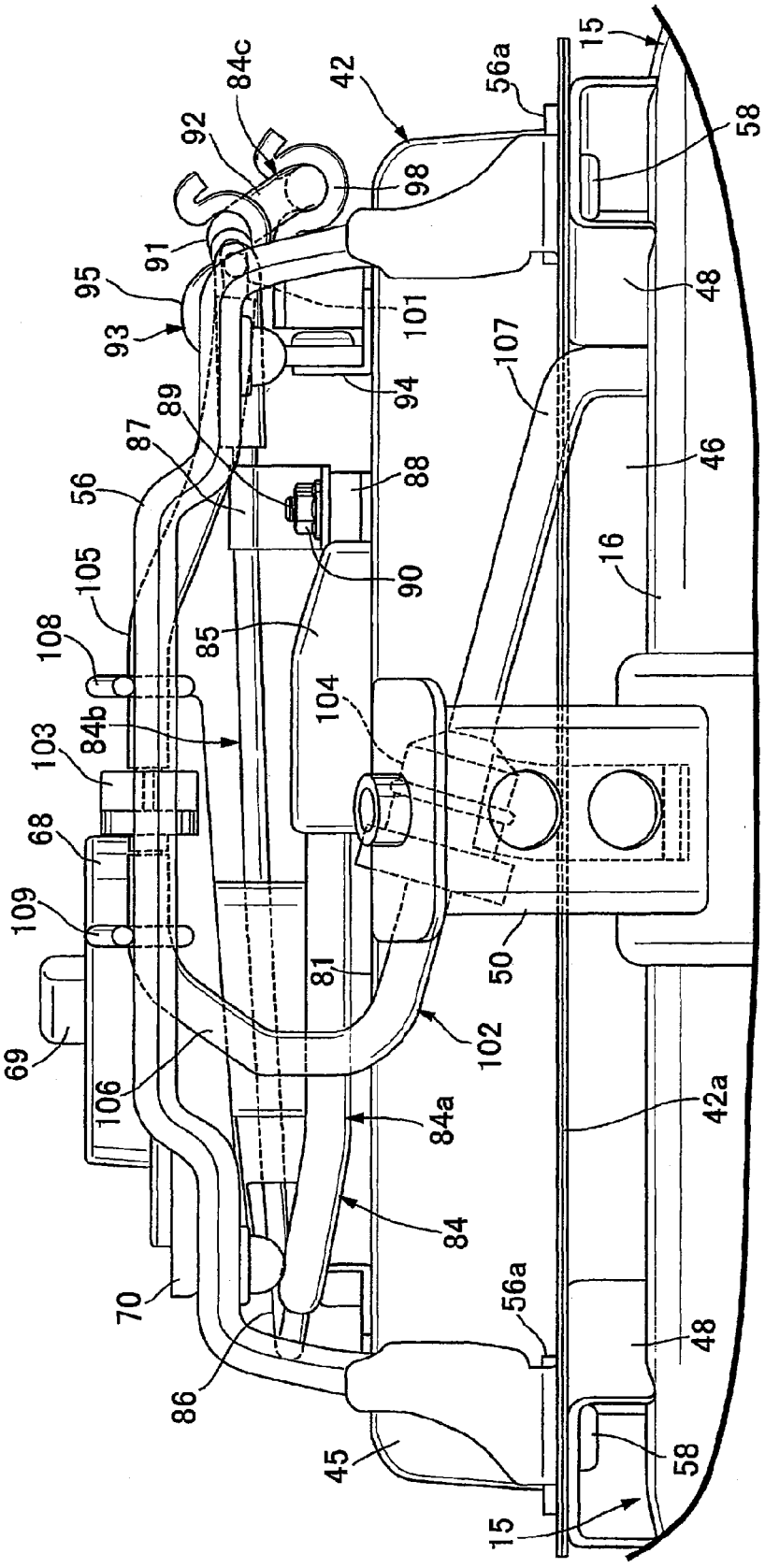
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FIG. 10

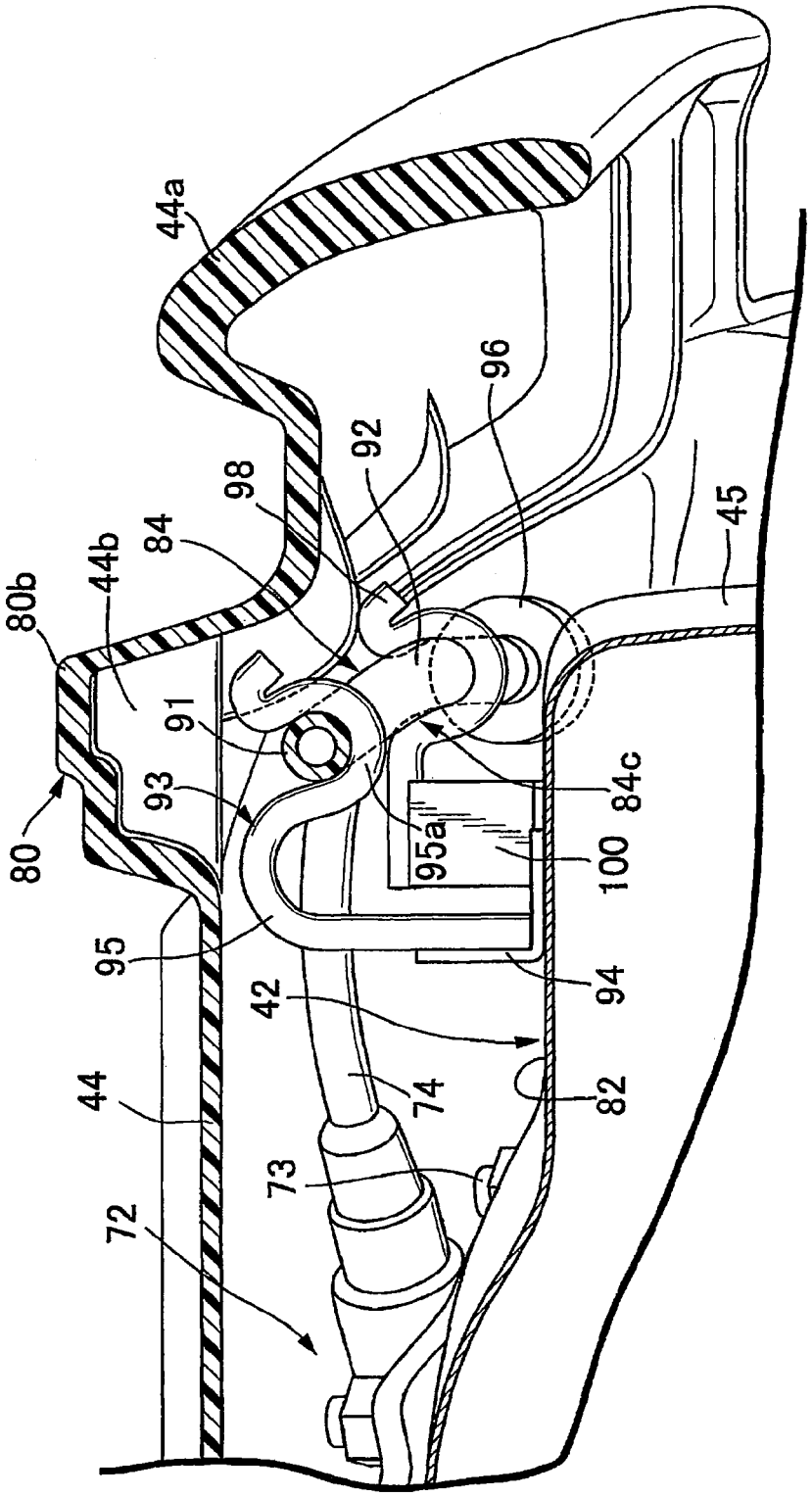
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FIG. 11

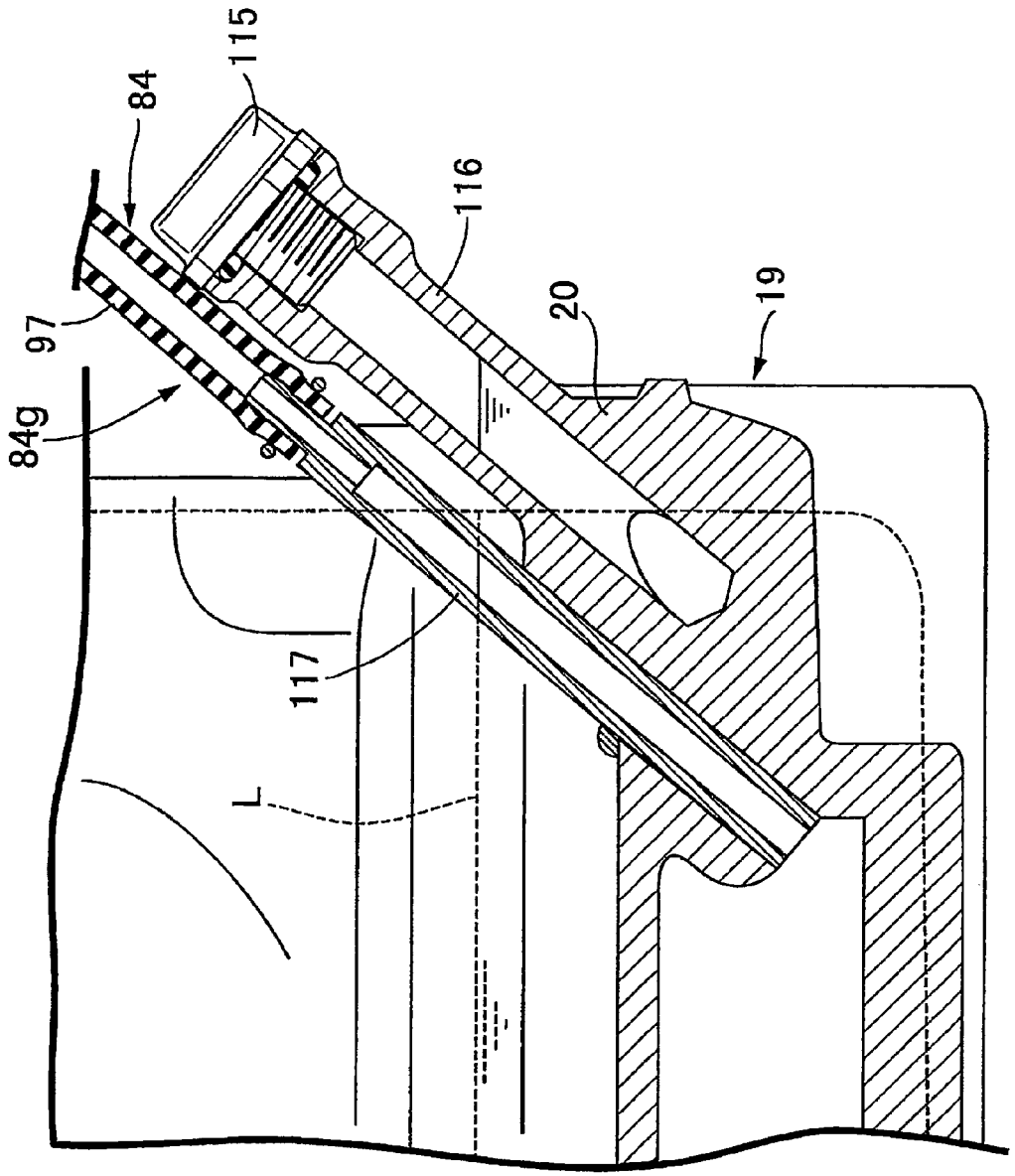

FIG. 12

EVAPORATED FUEL TREATMENT DEVICE FOR MOTORCYCLE

CROSS-REFERENCE TO RELATED APPLICATION

The present application claims the benefit of priority to Japanese Patent Application No. 2011-063114, filed on Mar. 22, 2011, the entire content of which is incorporated by reference.

TECHNICAL FIELD

The present disclosure relates to a motorcycle which includes a fuel tank which is arranged below a rider's seat and is supported on a vehicle body frame, a power unit which includes an engine generating power for driving a rear wheel, is arranged below the fuel tank and is swingably supported on the vehicle body frame, and a charge pipe passage which introduces a fuel gas from the fuel tank to an engine body such that the fuel gas evaporated in the fuel tank is absorbed by oil in the engine body of the engine, and more particularly to the improvement of an evaporated fuel treatment device.

BACKGROUND OF THE INVENTION

A device where a fuel gas generated in a fuel tank is absorbed by oil in an engine body is known by JP-UM-A-49-88172.

SUMMARY OF THE INVENTION

However, with respect to a motorcycle, when a fuel gas generated in a fuel tank is introduced to an engine body side through a charge pipe passage as in the case of the motorcycle disclosed in above-mentioned JP-UM-A-49-88172, there exists a possibility that oil in the engine body flows out to a charge pipe passage side when the motorcycle falls. Further, when an engine is a unit-swing-type engine, there also arises a drawback that it is necessary to mount a swing absorption part on the charge pipe passage.

The present disclosure has been made in view of such circumstances, and it is an object of the present disclosure to provide an evaporated fuel treatment device for a motorcycle where a charge pipe passage can follow the swinging of an engine while suppressing the flowout of oil toward a charge pipe passage side from an engine body when the motorcycle falls.

To achieve the above-mentioned object, according to the first technical feature of the present disclosure, there is provided an evaporated fuel treatment device for a motorcycle which includes: a fuel tank which is arranged below a rider's seat and is supported on a vehicle body frame; a power unit which includes an engine generating power for driving a rear wheel, is arranged below the fuel tank and is swingably supported on the vehicle body frame; and a charge pipe passage which introduces a fuel gas from the fuel tank to an engine body such that the fuel gas evaporated in the fuel tank is absorbed by oil in the engine body of the engine, wherein the charge pipe passage includes: a first engine-side pipe passage part which is arranged above the engine body in a vertically extending manner on one side in the vehicle widthwise direction of the engine body; a second engine-side pipe passage part which is communicably connected to a lower end of the first engine-side pipe passage part on one side in the vehicle widthwise direction and extends from one side to the other side in the vehicle widthwise direction above the engine body; and a third engine-side pipe passage part which is connected to the second engine-side pipe passage part on the other side in the vehicle widthwise direction and is connected to the engine body, a frame-side support part which supports the first engine-side pipe passage part is mounted on the vehicle body frame, an engine-side support part which supports the second engine-side pipe passage part is mounted on the engine, and at least a part of the charge pipe passage between the engine-side support part and the frame-side support part is formed of an elastic tube.

The present disclosure also has, in addition to the constitution of the first technical feature, the second technical feature that the engine body includes a crankcase and a cylinder head which is arranged in front of the crankcase, and the second engine-side pipe passage part is arranged so as to pass below an intake device which extends rearwardly from an upper side surface of the cylinder head.

The present disclosure also has, in addition to the constitution of the second technical feature, the third technical feature that the engine-side support part is mounted on the engine at a position closer to one side in the vehicle widthwise direction than the intake device as viewed in a plan view.

The present disclosure also has, in addition to the constitution of any one of the first to third technical features, the fourth technical feature that the vehicle body frame includes a pair of left and right seat frames which has inclined parts extending rearwardly and upwardly respectively, the power unit is swingably supported on the vehicle body frame below the seat frames, and the frame-side support part is arranged at an oblique rearward and upward position from the engine-side support part and is mounted on the inclined part of the seat frame on one side in the vehicle widthwise direction out of both seat frames.

The present disclosure also has, in addition to the constitution of the fourth technical feature, the fifth technical feature that a cross member is provided between the pair of seat frames behind the frame-side support part, the fuel tank which is arranged behind the cross member is supported on both seat frames, and the charge pipe passage includes a communication pipe passage part which is communicably connected to an upper end of the first engine-side pipe passage part on one side in the vehicle widthwise direction, extends toward the other side in the vehicle widthwise direction along the cross member, and is connected to the fuel tank.

A second cross member **38** in the embodiment corresponds to the cross member of the present disclosure.

According to the first technical feature of the present disclosure, the charge pipe passage includes: the first engine-side pipe passage part which is arranged above the engine body in a vertically extending manner on one side of the engine body in the vehicle widthwise direction; the second engine-side pipe passage part which is connected to the lower end of the first engine-side pipe passage part on one side in the vehicle widthwise direction and extends from one side to the other side in the vehicle widthwise direction above the engine body; and the third engine-side pipe passage part which is communicably connected to the second engine-side pipe passage part on the other side in the vehicle widthwise direction and is connected to the engine body and hence, it is possible to suppress the flowout of oil in the engine body to the inside of the charge pipe passage when the motorcycle falls. Further, the frame-side support part which supports the first engine-side pipe passage part is mounted on the vehicle body frame, the engine-side support part which supports the second engine-side pipe passage part is mounted on the engine, and at least a part of the charge pipe passage between the engine-

side support part and the frame-side support part is formed of the elastic tube and hence, the charge pipe passage can follow the swinging of the engine.

According to the second technical feature of the present disclosure, the second engine-side pipe passage part passes below the intake device which extends rearwardly from an upper side surface of the cylinder head provided to the engine body and hence, a part of the charge pipe passage can be arranged by making use of a dead space below the intake device.

According to the third technical feature of the present disclosure, the engine-side support part is arranged at a position closer to one side in the vehicle widthwise direction than the intake device as viewed in a plan view and hence, a part of the charge pipe passage which passes below the intake device can be fixed such that the part of the charge pipe passage does not swing relative to the engine body and hence, the intake device can be arranged close to the engine body while obviating the contact of the intake device with the charge pipe passage thus contributing to making the engine compact.

According to the fourth technical feature of the present disclosure, the engine body is swingably supported on the vehicle body frame below the pair of left and right seat frames extending rearwardly and upwardly, and the frame-side support part is arranged at an oblique rearward and upward position from the engine-side support part and is mounted on the inclined part of the seat frame on one side in the vehicle widthwise direction out of both seat frames and hence, the engine-side support part and the frame-side support part can be arranged in a spaced apart manner from each other in the longitudinal direction whereby a diffraction amount of the elastic tube caused by the swinging of the power unit can be made small.

According to the fifth technical feature of the present disclosure, the fuel tank which is arranged behind the cross member provided between the pair of seat frames behind the frame-side support part is supported on both seat frames, and the communication pipe passage part which constitutes a part of the charge pipe passage is communicably connected to the upper end of the first engine-side pipe passage part on one side in the vehicle widthwise direction, extends toward the other side in the vehicle widthwise direction along the cross member, and is connected to the fuel tank. Accordingly, the flowout of oil into the inside of the charge pipe passage from the engine body side can be more effectively suppressed.

BRIEF DESCRIPTION OF THE DRAWINGS

The advantages of the invention will become apparent in the following description taken in conjunction with the drawings, wherein:

FIG. **1** is a plan view showing a rear part of a vehicle body frame, a fuel tank and an engine;

FIG. **2** is a view as viewed in the direction indicated by an arrow **2** in FIG. **1**;

FIG. **3** is a view as viewed in the direction indicated by an arrow **3** in FIG. **1**;

FIG. **4** is a perspective view as viewed in the direction indicated by an arrow **4** in FIG. **1**;

FIG. **5** is a perspective view as viewed in the direction indicated by an arrow **5** in FIG. **1**;

FIG. **6** is a side view of a motorcycle;

FIG. **7** is a view showing the motorcycle in a state where a rider's seat is omitted as viewed in the direction indicated by an arrow **7** in FIG. **6**;

FIG. **8** is a perspective view of a part shown in FIG. **7** as viewed from an oblique anterior angle;

FIG. **9** is a cross-sectional view taken along a line **9-9** in FIG. **7**;

FIG. **10** is a view as viewed in the direction indicated by an arrow **10** in FIG. **1**;

FIG. **11** is an enlarged cross-sectional view taken along a line **11-11** in FIG. **7**; and

FIG. **12** is a cross-sectional view taken along a line **12-12** in FIG. **2**.

DETAILED DESCRIPTION OF THE INVENTION

An embodiment of the present disclosure is explained in conjunction with FIG. **1** to FIG. **12**. In the explanation of the embodiment made hereinafter, directions such as "frontward direction" and "rearward direction", and "leftward direction" and "rightward direction" follow the directions as viewed from a rider who rides on a motorcycle. Further, in the explanation made hereinafter, " . . . " is used for omitting the repetition of the use of the same reference symbol.

Firstly, in FIG. **1** to FIG. **5**, a pair of left and right seat frames **15**, **15** which constitutes a part of a vehicle body frame F of a scooter-type motorcycle is formed of a pipe. The pair of left and right seat frames **15**, **15** includes inclined parts **15***a* . . . which are inclined rearwardly and upwardly and horizontal parts **15***b* . . . which extend rearwardly from upper ends of the inclined parts **15***a* . . . respectively, and rear ends of both horizontal parts **15***b* . . . are integrally connected to each other by a connection part **16**.

A front part of a power unit P is supported on the vehicle body frame F in a vertically swingable manner by way of a link mechanism **17** below both seat frames **15** . . . , and a rear wheel WR which is arranged on a rear right side of the power unit P is pivotally supported on a rear part of the power unit P. Further, the power unit P is constituted of a forced air-cooled single cylinder 4-cycle engine E which generates power for driving the rear wheel WR and a continuously variable transmission M which is arranged between the engine E and the rear wheel WR, and a rear cushion unit **18** is arranged between a connection part between the inclined part **15***a* and the horizontal part **15***b* of the left seat frame **15** out of both seat frames **15** . . . and a rear part of the power unit P.

An engine body **19** of the engine E includes a crankcase **20** and a cylinder head **22** which is arranged in front of the crankcase **20**. The continuously variable transmission M is housed in the inside of a transmission case **23** which extends rearwardly from the engine body **19** while using a part of the crankcase **20** as a constitutional element thereof, and the rear wheel WR is pivotally supported on a rear part of the transmission case **23**.

A fan (not shown in the drawing) which is rotated in response to an operation of the engine E is housed in the transmission case **23**. one end portion of an intake duct **24** having a bellows shape is connected to a front part of the transmission case **23** for introducing cooling air into the inside of the transmission case **23** using the fan, and the other end portion of the intake duct **24** is connected to a lower part of the inclined part **15***a* of the left seat frame **15**. That is, air from the inside of the left seat frame **15** is introduced into the inside of the transmission case **23** as cooling air.

Most of the engine body **19** is covered with a shroud **25**, and is housed in the shroud **25**. The fan (not shown in the drawing) which sucks cooling air into the inside of the shroud **25** from an intake port **26** formed in a right side wall of the shroud **25** is housed in the shroud **25** in a state where the fan is driven by the engine E.

An intake device **28** is connected to an upper side surface of the cylinder head **22** of the engine body **19**. The intake device

28 includes an air cleaner 29 which is arranged on a left side of the rear wheel WR, a connecting tube 30 which has an upstream end thereof connected to the air cleaner 29, a throttle body 31 which is connected to a downstream end of the connecting tube 30, and an intake pipe 32 which connects the throttle body 31 and the cylinder head 22. A fuel injection valve 33 is mounted on the intake pipe 32.

Further, an exhaust device 34 is connected to a lower side surface of the cylinder head 22, and the exhaust device 34 includes an exhaust muffler 35 which is arranged on a right side of the rear wheel WR, and an exhaust pipe 36 which connects the exhaust muffler 35 and the cylinder head 22 to each other.

A first cross member 37 is provided between intermediate portions of the inclined parts 15*a* . . . of both seat frames 15 . . . which constitute a part of the vehicle body frame F in a state where the first cross member 37 straddles a front part of the engine body 19, and a second cross member 38 is provided between connection parts between the inclined parts 15*a* . . . and the horizontal parts 15*b* . . . of both seat frames 15 . . . .

As shown in FIG. 6, the vehicle body frame F is covered with a vehicle body cover 39 made of a synthetic resin, and a tandem-type rider's seat 40 is arranged above a rear part of the vehicle body cover 39.

The fuel tank 42 which is arranged below the rider's seat 40 is supported on a rear part of the vehicle body frame F in a state where the fuel tank 42 is arranged between the second cross member 38 which is provided between both seat frames 15 . . . and the connection part 16 which integrally connects the rear parts of both seat frames 15 . . . to each other. The fuel tank 42 is arranged above the power unit P.

To explain the embodiment also in conjunction with FIG. 7 to FIG. 9, the fuel tank 42 is covered with a tank cover 44 from above, and the tank cover 44 is integrally connected to a rear upper edge of a synthetic-resin-made storage box 43 which is arranged in front of the fuel tank 42 between both seat frames 15 . . . . The tank cover 44 extends rearwardly from the storage box 43 in a state where the tank cover 44 passes through a space formed between the rider's seat 40 and the fuel tank 42. Further, the storage box 43 is formed with an opened upper end, and this upper-end opening portion of the storage box 43 is closed by a front part of the rider's seat 40.

To focus on FIG. 9, the fuel tank 42 is formed by joining an upper tank half body 45 which has a box shape and opens downwardly and a lower tank half body 46 which has an box shape and opens upwardly to each other, and a flange part 42*a* which projects outwardly is formed on a joint portion of the upper tank half body 45 and the lower tank half body 46.

A first stay 47 is fixedly mounted on a center portion of the second cross member 38 in the vehicle widthwise direction in an upwardly projecting manner, and a front portion of the flange part 42*a* of the fuel tank 42 is fastened to and is supported on the first stay 47. Further, second stays 48 . . . which project upwardly are fixedly mounted on rear portions of the horizontal parts 15*b* . . . of both seat frames 15 . . . respectively, and both left and right rear portions of the flange part 42*a* of the fuel tank 42 are fastened to and are supported on the second stays 48 . . . .

A third stay 49 which projects downwardly is fixedly mounted on the second cross member 38 at a portion where the first stay 47 is fixedly mounted, a fourth stay 50 which projects vertically is fixedly mounted on the connection part 16 which integrally connects the rear parts of both seat frames 15 . . . to each other, and a fender 51 which is arranged between the fuel tank 42 and the rear wheel WR so as to cover the rear wheel WR from above is supported on a lower part of the third stay 49 and a lower part of the fourth stay 50.

A rear cover 52 which constitutes a part of the vehicle body cover 39 and is contiguously arranged with a rear part of the tank cover 44 and a carrier 53 which is arranged behind the rider's seat 40 are supported on an upper portion of the fourth stay 50 by fastening the rear cover 52 and the carrier 53 together by threadedly engaging bolts 55 with nuts 54 fixedly mounted on the upper portion of the fourth stay 50.

Here, projecting parts 44*a* . . . which project more outwardly than the rider's seat 40 are integrally formed with both sides of the tank cover 44, and both side portions of the carrier 53 are formed such that the side portions of the carrier 53 are smoothly and contiguously arranged with the projecting parts 44*a* . . . . Both projecting parts 44*a* . . . and both side portions of the carrier 53 function as a grab rail which a pillion who is seated on a rear part of the rider's seat 40 can grasp.

To explain the embodiment also in conjunction with FIG. 10, the rear part of the tank cover 44 which covers the fuel tank 42 from above is supported on a fifth stay 56 which is formed into an approximately downwardly-opened U shape in a state where the rear part of the tank cover 44 straddles the rear part of the fuel tank 42. Fastening plate portions 56*a* . . . which sandwich both left and right rear portions of the flange part 42*a* of the fuel tank 42 between the second stays 48 . . . and the fastening plate portions 56*a* . . . respectively are mounted on both left and right end portions of the fifth stay 56. Bolts 57 penetrate the fastening plate portions 56*a* . . . and the flange part 42*a* . . . and are threadedly engaged with welded nuts 58 which are fixedly mounted on lower surfaces of the second stays 48 . . . and hence, the fastening plate portions 56*a* . . . of both left and right end portions of the fifth stay 56 and both left and right rear portions of the flange part 42*a* of the fuel tank 42 are fastened together to the second stays 48 . . . respectively. Further, both sides of the rear part of the tank cover 44 are fastened to the fifth stay 56 by bolts 59, 59.

Box receiving members 60, 60 are mounted on both sides of the first cross member 37, and both sides of a front part of the storage box 43 are fastened to both box receiving members 60 . . . by bolts 61, 61 in a state where a resilient member (not shown in the drawing) is interposed between both sides of the front part of the storage box 43 and the box receiving members 60 . . . .

Here, the rider's seat 40 is rotatably and pivotally supported on an upper portion of a front end of the storage box 43 in a state where the rider's seat 40 is rotatable between a closed state where the rider's seat 40 covers the storage box 43 and the tank cover 44 from above and an open state where the storage box 43 and the tank cover 44 are exposed. A seal member 62 (see FIG. 9) which is resiliently brought into contact with an upper end of the storage box 43 in a closed state is mounted on a lower surface of the rider's seat 40.

Further, an engaging member 63 is mounted on a lower part of the rider's seat 40 at a position corresponding to a front part of the tank cover 44, and a seat locking opening portion 64 into which the engaging member 63 inserted in a state where the rider's seat 40 is closed is mounted on a connection part where the storage box 43 and the tank cover 44 are connected to each other.

Further, a seat locking stay 65 which is brought into contact with the front part of the tank cover 44 from below is arranged at a position corresponding to the seat locking opening portion 64 such that the front portion of the flange part 42*a* of the fuel tank 42 is sandwiched between the seat locking stay 65 and the first stay 47 and hence, the front portion of the flange part 42*a* and the seat locking stay 65 are fastened together to the first stay 47 by a pair of bolts 66, 66. Further, the front part of the tank cover 44 is fastened to the seat locking stay 65 by

bolts **66**, **66** which are arranged on both left and right sides of the seat locking opening portion **64**.

A seat locking mechanism not shown in the drawing is provided to the seat locking stay **65**, and the seat locking mechanism can change over a locked state where the seat locking mechanism is engaged with the engaging member **63** which is inserted into the seat locking opening portion **64** in a state where the rider's seat **40** is closed thus holding a closed state of the rider's seat **40** and an unlocked state which allows a manipulation to open the rider's seat **40** by releasing the engagement between the seat locking mechanism and the engaging member **63**.

A fuel filling port **67** is formed in an upper surface of the rear part of the fuel tank **42** on one side in the vehicle widthwise direction, that is, a left side in the vehicle widthwise direction in this embodiment. The fuel filling port **67** is formed of a fuel filling sleeve **68** which is fixedly mounted on the upper tank half body **45** of the fuel tank **42** in an upwardly projecting manner from the upper surface of the fuel tank **42**, and the fuel filling port **67** is closed by a cap **69** in an openable/closeable manner. Further, a tray **70** which receives fuel spilt from the fuel filling port **67** is arranged around the fuel filling port **67**, and the tray **70** is fixed to the fuel filling sleeve **68**.

An upper end portion of a pump module **72** for discharging fuel in the fuel tank **42** is fastened to a center portion of the upper surface of the front part of the fuel tank **42** in the vehicle widthwise direction by a plurality of bolts **73**, **73** . . . . A fuel supply tube **74** which is communicably connected to the pump module **72** has a portion which extends frontwardly from the pump module **72** above the fuel tank **42** on a right side in the vehicle widthwise direction, a portion which extends along the second cross member **38** from a right side to a left side in the vehicle widthwise direction, and a portion which extends toward the fuel injection valve **33** from the second cross member **38** on a left side in the vehicle widthwise direction partially along the inclined part **15***a* of the left seat frame **15**, and the fuel supply tube **74** having such portions is connected to the fuel injection valve **33**. To support the fuel supply tube **74**, an fuel supply tube support member **75** is mounted on the second cross member **38**, fuel supply tube support members **76**, **77** are mounted on the inclined part **15***a* of the left seat frame **15**, and an fuel supply tube support member **78** is mounted on an upper surface of the shroud **25** in the vicinity of the fuel injection valve **33**.

An opening portion **79** which allows the fuel filling port **67** formed in the upper surface of the fuel tank **42** to face upwardly is formed in the tank cover **44**, and the tray **70** is resiliently brought into contact with a lower surface of the tank cover **44** so as to close the opening portion **79**.

A bulging part **80** which dams up the fuel overflown to the outside of the opening portion **79** at the time of supplying fuel to the fuel filling port **67** from above is formed on the tank cover **44** in an upwardly bulging manner in a state where the bulging part **80** is endlessly continued so as to surround the opening portion **79**. Particularly, a rear portion **80***a* of the bulging part **80** largely bulges more upwardly than a front portion of the bulging part **80**, and both left and right side portions **80***b*, **80***b* are formed such that an upwardly bulging amount is gradually increased as the both left and right side portions **80***b*, **80***b* extend from a front side to a rear side. Further, a pair of projections **40***a* . . . which is formed on a rear lower part of the rider's seat **40** is brought into contact with an upper portion of the rear portion **80***a* of the bulging part **80** when an occupant is seated on the rider's seat **40** so that the rear part **80***a* of the bulging part **80** receives a weight of the rider's seat **40**.

The upper surface of the above-mentioned fuel tank **42** includes a higher part **81** where the fuel filling port **67** is formed and a lower part **82** which is lower than the higher part **81**, and the pump module **72** is arranged on the lower part **82**. The lower part **82** is arranged on a front part of the upper surface of the fuel tank **42** in an offset manner toward a right side in the vehicle widthwise direction, and is formed in a downwardly inclined manner toward the crankcase **20** of the engine body **19**.

A fuel gas evaporated in the fuel tank **42** is absorbed in oil in the crankcase **20** which constitutes a fuel absorption means, wherein the crankcase **20** is arranged below the upper surface of the fuel tank **42** such that the fuel gas is absorbed outside the fuel tank **42**. The fuel gas generated in the fuel tank **42** is introduced into the crankcase **20** through a charge pipe passage **84**.

The charge pipe passage **84** includes a first tank-side pipe passage part **84***a* which is connected to the upper surface of the fuel tank **42**, and a second tank-side pipe passage part **84***b* which is communicably connected with the first tank-side pipe passage part **84***a* and extends toward the other side of the fuel tank **42** from one side of the fuel tank **42** in the vehicle widthwise direction on an end portion thereof on a fuel tank **42** side. The first tank-side pipe passage part **84***a* extends toward one side of the fuel tank **42** in the vehicle widthwise direction from a connection part **85** connected to the upper surface of the fuel tank **42**, and is communicably connected to the second tank-side pipe passage part **84***b*. In this embodiment, the connection part **85** connected to the upper surface of the fuel tank **42** is arranged behind the fuel filling port **67** and on a center portion of the higher part **81** of the upper surface of the fuel tank **42** in the vehicle widthwise direction in an offset manner from the fuel filling port **67** formed in the upper surface of the fuel tank **42** on a left side in the vehicle widthwise direction. The first tank-side pipe passage part **84***a* is arranged such that the first tank-side pipe passage part **84***a* extends leftwardly in the vehicle widthwise direction from the connection part **85**, and the second tank-side pipe passage part **84***b* which is connected to the first tank-side pipe passage part **84***a* is arranged such that the second tank-side pipe passage part **84***b* extends toward a right side from the left side in the vehicle widthwise direction.

The first tank-side pipe passage part **84***a* and the second tank-side pipe passage part **84***b* are connected to each other such that the first tank-side pipe passage part **84***a* and the second tank-side pipe passage part **84***b* surround the periphery of the fuel filling port **67**, a part of the first tank-side pipe passage part **84***a* and a part of the second tank-side pipe passage part **84***b* are arranged so as to pass below the tray **70** which receives fuel spilled from the fuel filling port **67**. A Part which constitutes a portion of the first tank-side pipe passage part **84***a* and a portion of the second tank-side pipe passage part **84***b* and passes below the tray **70** is formed of a metallic pipe **86** which is bent so as to surround a part of the fuel filling sleeve **68**. For example, two portions of the metallic pipe **86** are held by pipe holding members **87**, **87**. Mounting members **88**, **88** are welded to the higher part **81** of the upper surface of the fuel tank **42** corresponding to the pipe holding members **87** . . . , and the pipe holding members **87** . . . are mounted on the mounting members **88** . . . by bolts **89** . . . and nuts **90** . . . . Painting treatment is applied to the fuel tank **42** including the mounting members **88** . . . , and the metallic pipe **86** is fastened to the fuel tank **42** to which the painting treatment is applied.

Further, the charge pipe passage **84** includes a third tank-side pipe passage part **84***c* which is connected to the second tank-side pipe passage part **84***b* on the other side in the vehicle

widthwise direction (right side in this embodiment), and has a highest part **91** arranged at a highest position of the charge pipe passage **84** at an intermediated position thereof. The third tank-side pipe passage part **84***c* is arranged to extend frontwardly above the lower part **82** of the upper surface of the fuel tank **42**.

A part of the third tank-side pipe passage part **84***c* which includes at least the highest part **91** is formed of an elastic tube **92**, and the highest part **91** of the elastic tube **92** is supported on a highest part support part **93** mounted on the fuel tank **42** from below.

To focus on FIG. **11**, the highest part support part **93** is constituted of a support plate **94** which is fixedly mounted on the upper surface of the fuel tank **42** and an upper open clamper **95** which is fixedly mounted on the support plate **94**, and the highest part **91** of the elastic tube **92** is supported on an approximately U-shaped holding part **95***a* which is formed on a part of the upper open clamper **95** formed of a round rod and opens upwardly from below.

The highest part support part **93** is arranged below the right side portion **80***b* of the bulging part **80** which is formed on the tank cover **44** so that a relatively large empty space is formed above the highest part support part **93**. In view of the above, a rib **44***b* which prevents the elastic tube **91** from being upwardly removed from the upper open clamper **95** is integrally formed on the tank cover **44** such that the rib **44***b* traverses the inside of the right side portion **80***b*. It is desirable that the rib **44***b* is arranged just above the upper open clamper **95**. Although the rib **44***b* is arranged just above the upper open clamper **95** in this embodiment, the rib **44***b* may be arranged in a slightly offset manner in the longitudinal direction of the elastic tube **91** from just above the upper open clamper **95** provided that the upward removal of the elastic tube **91** from the upper open clamper **95** can be prevented at such a position.

Further, as clearly shown in FIG. **10**, a part of the charge pipe passage **84** ranging from the highest part **91** to the connection part **85** with the fuel tank **42** is arranged with a downward gradient toward the connection part **85**.

A first check valve **96** which prevents a backflow of a fuel gas toward a fuel tank **42** side is interposed on a part of the third tank-side pipe passage part **84***c* of the charge pipe passage **84** downstream of the highest part **91** in a state where the first check valve **96** is supported on the fuel tank **42**. The first check valve **96** is arranged above the lower part **82** of the upper surface of the fuel tank **42**.

A part of the third tank-side pipe passage part **84***c* of the charge pipe passage **84** includes the elastic tube **92** which has a downstream end thereof connected to the first check valve **96** and is arranged above the fuel tank **42**, and an elastic tube **97** which has an upstream end thereof connected to the first check valve **96** and is arranged above the fuel tank **42**. The elastic tube **92** is held by an upper open clamper **98** downstream of a portion thereof held by the upper open clamper **95**, and an upstream end portion of the elastic tube **97** is held by an upper open clamper **99**.

The upper open clampers **98**, **99** are fixedly mounted in common on a support plate **100** which is fixedly mounted on the upper surface of the fuel tank **42**. The removal of the elastic tubes **92**, **97** from the upper open clampers **95**, **98**, **99** mounted on the upper surface of the fuel tank **42** is prevented by the tank cover **44** which covers the fuel tank **42** from above.

A branch part **101** is formed on the third tank-side pipe passage part **84***c* of the charge pipe passage **84** at a position closer to the fuel tank **42** side than the first check valve **96**. An atmospheric air introducing pipe passage **102** which introduces atmospheric air to the inside of the fuel tank **42** is connected to the branch part **101**, and a second check valve **103** which prevents the flow of a fuel gas from the fuel tank **42** side is interposed on the atmospheric air introducing pipe passage **102**. Further, as clearly shown in FIG. **10**, the second check valve **103** is arranged at a position higher than the highest part **91** of the charge pipe passage **84**.

The atmospheric air introducing pipe passage **102** opens in atmospheric air below the second check valve **103**. In this embodiment, the atmospheric air introducing pipe passage **102** is connected to the connection part **16** in such a manner that the atmospheric air introducing pipe passage **102** opens in atmospheric air in the pipe-shaped connection part **16** which connects rear parts of the pair of left and right seat frames **15** . . . to each other.

Further, a filter **104** is interposed on the atmospheric air introducing pipe passage **102** at a position closer to an atmospheric air open side, that is, the connection part **16** side than the second check valve **103**. The filter **104** is interposed on a portion of the atmospheric air introducing pipe passage **102** which has a downward gradient toward the atmospheric air open side, that is, the connection part **16** side.

The atmospheric air introducing pipe passage **102** includes an elastic tube **105** which has one end portion thereof connected to the branch part **101** and the other end portion thereof connected to the second check valve **103**, an elastic tube **106** which has one end portion thereof connected to the second check valve **103** and the other end thereof connected to the filter **104**, and an elastic tube **107** which has one end portion thereof connected to the filter **104** and the other end portion thereof connected to the connection part **16** of the vehicle body frame F. The elastic tube **106** is arranged in an arcuately bent shape while connecting the second check valve **103** and the filter **104** arranged at an oblique rearward and downward position from the second check valve **103**, and a part of the elastic tube **106** and the elastic tube **107** are arranged such that these parts have a downward gradient toward the connection part **16** while connecting the filter **104** therebetween.

The other end portion of the elastic tube **105** and one end portion of the elastic tube **106** are held by upper open clampers **108**, **109** at a position where the second check valve **103** is sandwiched between the elastic tube **105** and the elastic tube **106**. These upper open clampers **108**, **109** are fixedly mounted on the fifth stay **56** which constitutes a part of the vehicle body frame F so that the removal of the elastic tubes **105**, **106** from these upper open clampers **108**, **109** can be prevented by the tank cover **44** which covers the fuel tank **42** from above.

The second check valve **104** is arranged below the rear portion **80***a* which receives a load from the rider's seat **40** out of the bulging part **80** formed on the tank cover **44** which covers the fuel tank **42** from above.

The charge pipe passage **84** includes: a communication pipe passage part **84***d* which is connected to the third tank-side pipe passage part **84***c* on the other side in the vehicle widthwise direction (a right side in this embodiment) and extends toward one side in the vehicle widthwise direction (a left side in this embodiment) along the second cross member **38**; a first engine-side pipe passage part **84***e* which is connected to the communication pipe passage part **84***d* and is arranged above the engine body **19** in a vertically extending manner on one side in the vehicle widthwise direction; a second engine-side pipe passage part **84***f* which is connected to a lower end of the first engine-side pipe passage part **84***e* on one side in the vehicle widthwise direction and extends from one side to the other side in the vehicle widthwise direction above the engine body **19**; and a third engine-side pipe pas-

sage part **84***g* which is connected to the second engine-side pipe passage part **84***f* on the other side in the vehicle widthwise direction and is connected to the engine body **19**.

In this embodiment, the communication pipe passage part **84***d* is connected to the third tank-side pipe passage part **84***c* on the right side in the vehicle widthwise direction and extends leftwardly in the vehicle widthwise direction along the second cross member **38**. The communication pipe passage part **84***d* is connected to an upper end of the first engine-side pipe passage part **84***e* on the left side in the vehicle widthwise direction and extends rightwardly in the vehicle widthwise direction along the second cross member **38** and is connected to the fuel tank **42** through the third, the second and the first tank-side pipe passage parts **84***c*, **84***b*, **84***a*. The first engine-side pipe passage part **84***e* extends in the vertical direction on the left side in the vehicle widthwise direction, the second engine-side pipe passage part **84***f* is arranged in an extending manner from the left side to the right side in the vehicle widthwise direction above the engine body **19**, and the third engine-side pipe passage part **84***g* is connected to the crankcase **20** of the engine body **19** on the right side in the vehicle widthwise direction.

A frame-side support part **110** which supports an intermediate part of the first engine-side pipe passage part **84***e* is mounted on the vehicle body frame F, and on an upper surface of the shroud **25** of the engine E, an engine-side support part **111** which supports an intermediate part of the second engine-side pipe passage part **84***f* is mounted. The engine-side support part **111** is mounted on the upper surface of the shroud **25** together with the fuel supply tube support member **77** by bolts **112**.

The engine-side support part **111** is arranged at a position closer to one side in the vehicle widthwise direction (left side in this embodiment) than the intake device **28** as viewed in a plan view, and the frame-side support part **110** is arranged at an oblique rearward and upward position from the engine-side support part **111**, and is mounted on the inclined part **15***a* of the seat frame **15** on one side in the vehicle widthwise direction (left side in this embodiment) out of both seat frames **15** . . . .

Further, at least a part of the charge pipe passage **84** between the engine-side support part **111** and the frame-side support part **110** is formed of the elastic tube **97**. In this embodiment, the elastic tube **97** which forms a part of the third tank-side pipe passage part **84***c* and has one end portion thereof connected to the first check valve **96** constitutes the whole communication pipe passage part **84***d*, the whole first engine-side pipe passage part **84***e*, the whole second engine-side pipe passage part **84***f* and a part of the third engine-side pipe passage part **84***g*.

Further, as shown in FIG. **1**, the second engine-side pipe passage part **84***f* is arranged so as to pass below the connecting tube **30** and the throttle body **31** of the intake device **28**.

As shown in FIG. **12**, the third engine-side pipe passage part **84***g* is connected to the crankcase **20** in such a manner that the third engine-side pipe passage part **84***g* is arranged adjacent to, inside in the vehicle widthwise direction, a fuel supply pipe **116** which is arranged on a right side part of the crankcase **20** for supplying oil to the inside of the crankcase **20** of the engine body **19**, extends obliquely in the upward direction, and has an upper end portion thereof closed by a cap **115**. The third engine-side pipe passage part **84***g* is constituted of a part of the elastic tube **97**, and a metallic tubular body **117** which has an upper end portion thereof connected to the elastic tube **97** and is fixedly mounted on the crankcase **20**. The other end of the tubular body **117** opens in the inside of the crankcase **20** below an oil surface L of oil in the crankcase **20**. Accordingly, a fuel gas which is evaporated in the fuel tank **42** and is introduced through the charge pipe passage **84** is absorbed by oil in the crankcase **20**.

Next, the manner of operation of this embodiment is explained. The charge pipe passage **84** which introduces a fuel gas evaporated in the fuel tank **42** toward the crankcase **20** which constitutes the fuel absorption means includes the first tank-side pipe passage part **84***a* which is connected to the upper surface of the fuel tank **42** and the second tank-side pipe passage part **84***b* which is communicably connected with the first tank-side pipe passage part **84***a* and extends toward the other side (right side in this embodiment) of the fuel tank **42** from one side (left side in this embodiment) of the fuel tank **42** in the vehicle widthwise direction on the end portion thereof on the fuel tank **42** side. The first tank-side pipe passage part **84***a* and the second tank-side pipe passage part **84***b* are fixed to the upper surface of the fuel tank **42**. Accordingly, even when the first tank-side pipe passage part **84***a* is connected to the fuel tank **42** at either one of positions in the vehicle widthwise direction, it is possible to suppress an amount of fuel which flows out from the fuel tank **42** toward the crankcase **20** through the charge pipe passage **84** when the motorcycle falls. Further, at least the part of the charge pipe passage **84** can be mounted on the fuel tank **42** in advance and hence, the structure can contribute to the enhancement of assembling property.

The first tank-side pipe passage part **84***a* extends toward one side (left side in this embodiment) of the fuel tank **42** from the connection part **85** connected to the upper surface of the fuel tank **42** in the vehicle widthwise direction, and is connected to the second tank-side pipe passage part **84***b*. Accordingly, the flowout of fuel when the motorcycle falls can be effectively suppressed.

The fuel filling port **67** is formed in the upper surface of the fuel tank **42** on one side in the vehicle widthwise direction (left side in this embodiment), and the first tank-side pipe passage part **84***a* which is connected to the upper surface of the fuel tank **42** at a position offset from the fuel filling port **67** and the second tank-side pipe passage part **84***b* are connected to each other in a state where the first tank-side pipe passage part **84***a* and the second tank-side pipe passage part **84***b* surround the periphery of the fuel filling port **67**. Accordingly, the part of the first tank-side pipe passage part **84***a* and the part of the second tank-side pipe passage part **84***b* can be arranged with large curvatures respectively by making use of a dead space around the fuel filling port **67** thus easing the arrangement of the first tank-side pipe passage part **84***a* and the second tank-side pipe passage part **84***b*.

The tray **70** which receives fuel spilt from the fuel filling port **67** is arranged around the fuel filling port **67**, and the part of the first tank-side pipe passage part **84***a* and the part of the second tank-side pipe passage part **84***b* are arranged to pass below the tray **70**. Accordingly, even when the part of the first tank-side pipe passage part **84***a* and the part of the second tank-side pipe passage part **84***b* are arranged so as to surround the fuel filling port **67**, an area of the tray **70** can be increased.

The charge pipe passage **84** is connected to the second tank-side pipe passage part **84***b* on the other side in the vehicle widthwise direction (right side in this embodiment), and includes the third tank-side pipe passage part **84***c* which has the highest part **91** arranged at the highest position of the charge pipe passage **84** at an intermediated position thereof. Accordingly, the flowout of fuel when the motorcycle falls can be more effectively suppressed.

Further, the part of the third tank-side pipe passage part **84***c* which includes at least the highest part **91** is formed of the elastic tube **92**, and the highest part **91** of the elastic tube **92** is

supported on the highest part support part **93** mounted on the fuel tank **42** from below. Accordingly, the degree of freedom in design can be enhanced by determining the height of the highest part **91** based on the height of the highest part support part **93**. Further, the part of the charge pipe passage **84** ranging from the highest part **91** to the connection part **85** with the fuel tank **42** is arranged with a downward gradient toward the connection part **85** side. Accordingly, fuel stored in the charge pipe passage **84** between the highest part **91** and the fuel tank **42** can be easily returned to the fuel tank **42** side.

The downstream end of the charge pipe passage **84** is connected to the crankcase **20** in a state where the downstream end of the charge pipe passage **84** opens in the oil in the crankcase **20**, and the first check valve **96** which prevents a backflow of a fuel gas toward the fuel tank **42** is interposed on a portion of the charge pipe passage **84** downstream of the highest part **91**. Accordingly, it is possible to effectively prevent oil in the crankcase **20** from flowing toward the fuel tank **42** by the first check valve **96**, and it is also possible to enhance assembling property by supporting the first check valve **96** on the fuel tank **42**.

The upper surface of the fuel tank **42** includes the higher part **81** in which the fuel filling port **67** is formed and the lower part **82** lower than the higher part **81**, and the first check valve **96** is arranged on the lower part **82**. Accordingly, it is possible to prevent the first check valve **96** from taking the high arrangement position. Further, the lower part **82** is formed in a downwardly inclined manner toward the crankcase **20**. Accordingly, it is possible to make the flow of a fuel gas which passes through the first check valve **96** smooth.

The atmospheric air introducing pipe passage **102** which introduces an atmospheric air to the inside of the fuel tank **42** is connected to the branch part **101** which is formed on the third tank-side pipe passage part **84***c* of the charge pipe passage **84** at a position closer to the fuel tank **42** side than the first check valve **96**, and the second check valve **103** which prevents the flow of fuel from the fuel tank **42** side is interposed on the atmospheric air introducing pipe passage **102**. Accordingly, when the pressure inside the fuel tank **42** becomes a negative pressure, atmospheric air is introduced into the inside of the fuel tank **42** so as to adjust the pressure in the fuel tank **42** to an atmospheric pressure. Further, it is possible to prevent a fuel gas from being discharged to the outside through the atmospheric air introducing pipe passage **102** by the second check valve **103**.

The parts of the elastic tube **92**, **97** which constitute at least a part of the charge pipe passage **84** and are arranged above the fuel tank **42** are held by the upper open clampers **95**, **98**, **99** which are mounted on the upper surface of the fuel tank **42**, and the fuel tank **42** is covered from above with the tank cover **44** which prevents the removal of the elastic tubes **92**, **97** from the upper open clampers **95**, **98**, **99**. Accordingly, the part of the charge pipe passage **84** can be supported on the fuel tank **42** with the simple structure and hence, the assembling property can be enhanced.

Paint treatment is applied to the outer surface of the fuel tank **42**, and the metallic pipe **86** which constitutes the part of the charge pipe passage **84** is fastened to the fuel tank **42**. Accordingly, compared to a case where the metallic pipe **86** is fixed to the fuel tank **42** by welding, it is unnecessary to apply masking to the metallic pipe **86** and hence, a painting cost can be reduced.

The second check valve **103** is arranged at a position higher than the highest part **91** formed on the third tank-side pipe passage part **84***c* of the charge pipe passage **84** and hence, the second check valve **103** suppresses the inflow of fuel toward the second check valve **103** thus enhancing durability of the second check valve **103** by preventing the adhesion of fuel to the second check valve **103**.

The branch part **101** is arranged on the third tank-side pipe passage part **84***c* at the position closer to the fuel tank **42** side than the highest part **91**. Accordingly, even if fuel flown out from the fuel tank **42** flows into the atmospheric air introducing pipe passage **102** at the connection part with the charge pipe passage **84**, that is, between the branch part **101** and the second check valve **103** when a motorcycle falls, fuel in the atmospheric air introducing pipe passage **102** returns to a position upstream of the highest part **91** of the charge pipe passage **84** when the motorcycle is raised after falling and hence, the flow of fuel toward the engine body **19** can be prevented.

The atmospheric air introducing pipe passage **102** opens in atmospheric air below the second check valve **103**. Accordingly, even when water enters the inside of the atmospheric air introducing pipe passage **102** through an atmospheric air open end of the atmospheric air introducing pipe passage **102**, it is possible to make water which enters the atmospheric air introducing pipe passage **102** difficult to reach the second check valve **103**. The filter **104** is interposed on the atmospheric air introducing pipe passage **102** at a position closer to the atmospheric air open side than the second check valve **103** and hence, dusts hardly adhere to the second check valve **103**. Further, the filter **104** is interposed on a part of the atmospheric air introducing pipe passage **102** which has a downward gradient toward the atmospheric air open side and hence, even when the filter **104** is wetted with water, it is possible to drain water toward the atmospheric air open end side from the filter **104**.

On the tank cover **44** which covers the fuel tank **42** from above and includes the opening portion **79** which upwardly faces the fuel filling port **67** formed in the upper surface of the fuel tank **42**, the bulging part **80** which receives a load from the rider's seat **40** and dams up fuel overflown to the outside of the opening portion **79** at the time of filling fuel to the fuel filling port **67** from above is formed in an upwardly bulging manner, and the second check valve **103** is arranged below the bulging part **80**. Accordingly, the second check valve **103** is arranged at a high position and hence, it is possible to make water which enters the inside of the atmospheric air introducing pipe passage **102** more difficult to reach the second check valve **103**.

The charge pipe passage **84** includes: the first engine-side pipe passage part **84***e* which is arranged above the engine body **19** in a vertically extending manner on one side in the vehicle widthwise direction (left side in this embodiment) of the engine body **19**; the second engine-side pipe passage part **84***f* which is connected to the lower end of the first engine-side pipe passage part **84***e* on one side in the vehicle widthwise direction and extends from one side to the other side in the vehicle widthwise direction (right side in this embodiment) above the engine body **19**; and the third engine-side pipe passage part **84***g* which is connected to the second engine-side pipe passage part **84***f* on the other side in the vehicle widthwise direction and is connected to the engine body **19**. Accordingly, it is possible to suppress the flow out of oil in the engine body **19** to the inside of the charge pipe passage **84** when the motorcycle falls.

Further, the frame-side support part **110** which supports the first engine-side pipe passage part **84***e* is mounted on the vehicle body frame F, the engine-side support part **111** which supports the second engine-side pipe passage part **84***f* is mounted on the shroud **25** of the engine E, and at least a part of the charge pipe passage **84** between the engine-side sup-

port part **111** and the frame-side support part **110** is formed of the elastic tube **97** and hence, the charge pipe passage **84** can follow the swing of the engine E.

The second engine-side pipe passage part **84***f* is arranged so as to pass below the intake device **28** which extends rearwardly from an upper side surface of the cylinder head **22** of the engine body **19** and hence, a part of the charge pipe passage **84** can be arranged by making use of a dead space below the intake device **28**.

The engine-side support part **111** is mounted on the engine E at a position closer to one side in the vehicle widthwise direction than the intake device **28** as viewed in a plan view. Accordingly, a part of the charge pipe passage **84** which passes below the intake device, that is, the second engine-side pipe passage part **84***f* can be fixed such that the second engine-side pipe passage part **84***f* does not swing relative to the engine body **19** and hence, the intake device **28** can be arranged close to the engine body **19** while obviating the contact of the intake device **28** with the charge pipe passage **84** thus contributing to making the engine E compact.

The vehicle body frame F includes the pair of left and right seat frames **15** . . . which has the inclined parts **15***a* . . . extending rearwardly and upwardly respectively, the power unit P is swingably supported on the vehicle body frame F below the seat frames **15** . . . , and the frame-side support part **110** is arranged at an oblique rearward and upward position from the engine-side support part **111** and is mounted on the inclined part **15***a* of the seat frame **15** on one side in the vehicle widthwise direction (left side in this embodiment) out of both seat frames **15** . . . . Accordingly, the engine-side support part **111** and the frame-side support part **110** can be arranged in a spaced-apart manner from each other in the longitudinal direction and hence, a diffraction amount of the elastic tube **97** caused by the swing of the power unit P can be made small.

Further, the second cross member **38** is provided between the pair of seat frames **15** . . . behind the frame-side support part **110**, the fuel tank **42** which is arranged behind the second cross member **38** is supported on both seat frames **15** . . . , and the charge pipe passage **84** includes the communication pipe passage part **84***d* which is communicably connected to the upper end of the first engine-side pipe passage part **84***e* on one side in the vehicle widthwise direction, extends toward the other side in the vehicle widthwise direction along the second cross member **38**, and is connected to the fuel tank **42**. Accordingly, the flowout of oil into the inside of the charge pipe passage **84** from the engine body **19** side can be more effectively suppressed.

Although the embodiment of the present disclosure has been explained heretofore, the present disclosure is not limited to the above-mentioned embodiment, and various design modifications may be made without departing from the gist of the present disclosure described in Claims.

Although a specific form of embodiment of the instant invention has been described above and illustrated in the accompanying drawings in order to be more clearly understood, the above description is made by way of example and not as a limitation to the scope of the instant invention. It is contemplated that various modifications apparent to one of ordinary skill in the art could be made without departing from the scope of the invention which is to be determined by the following claims.

We claim:

1. An evaporated fuel treatment device for a motorcycle, comprising:

a fuel tank arranged below a rider's seat and supported on a vehicle body frame;

a power unit, including an engine generating power for driving a rear wheel, arranged below the fuel tank and swingably supported on the vehicle body frame; and

a charge pipe passage configured to introduce a fuel gas from the fuel tank to an engine body such that the fuel gas evaporated in the fuel tank is absorbed by oil in the engine body of the engine, wherein

the charge pipe passage comprises:

a first engine-side pipe passage part arranged above the engine body in a vertically extending manner on one side of the engine body in a vehicle widthwise direction;

a second engine-side pipe passage part connected to a lower end of the first engine-side pipe passage part on a first side in the vehicle widthwise direction and extends from the first side to a second side in the vehicle widthwise direction above the engine body; and

a third engine-side pipe passage part connected to the second engine-side pipe passage part on the second side in the vehicle widthwise direction and connected to the engine body, and

a frame-side support part configured to support the first engine-side pipe passage part and is mounted on the vehicle body frame,

an engine-side support part, which supports the second engine-side pipe passage part, is mounted on the engine, and at least a part of the third engine side pipe passage part located between the engine-side support part and the frame-side support part is formed of an elastic tube.

2. The evaporated fuel treatment device for a motorcycle according to claim **1**, wherein the engine body comprises:

a crankcase and

a cylinder head which is arranged in front of the crankcase, and wherein

the second engine-side pipe passage part is arranged so as to pass below an intake device which extends rearwardly from an upper side surface of the cylinder head.

3. The evaporated fuel treatment device for a motorcycle according to claim **2**, wherein

the engine-side support part is mounted on the engine at a position closer to the first side in the vehicle widthwise direction than the intake device as viewed in a plan view.

4. The evaporated fuel treatment device for a motorcycle according to claim **1**, wherein the vehicle body frame comprises:

a pair of left and right seat frames which have inclined parts extending rearwardly and upwardly respectively, wherein

the power unit is swingably supported on the vehicle body frame below the seat frames, and

the frame-side support part is arranged at an oblique rearward and upward position from the engine-side support part and is mounted on the inclined part of the seat frame on the first side in the vehicle widthwise direction out of both seat frames.

5. The evaporated fuel treatment device for a motorcycle according to claim **4**, wherein a cross member is provided between the pair of seat frames behind the frame-side support part,

the fuel tank, which is arranged behind the cross member, is supported on both seat frames, and

the charge pipe passage comprises:

a communication pipe passage part which is connected to an upper end of the first engine-side pipe passage part on the first side of the vehicle in a widthwise direction, and extends toward the second side of the vehicle in a widthwise direction along the cross member, and is connected to the fuel tank.

6. The evaporated fuel treatment device for a motorcycle according to claim 1, wherein the at least a part of the charge pipe passage is at least a part of the third engine-side pipe passage part.

7. The evaporated fuel treatment device for a motorcycle according to claim 1, wherein the first engine-side pipe passage part and the second engine-side pipe passage part are connected to each other such that the first engine-side pipe passage part and the second engine-side pipe passage part surround the periphery of a fuel filling port.

8. The evaporated fuel treatment device for a motorcycle according to claim 1, wherein a part of the third engine-side pipe passage part which includes at least a highest part is formed of an elastic tube.

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